

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 August 2004 (19.08.2004)

PCT

(10) International Publication Number
WO 2004/069478 A3

(51) International Patent Classification⁷: **B24B 53/00,**
B23Q 15/007

(21) International Application Number:
PCT/IB2004/050041

(22) International Filing Date: 20 January 2004 (20.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03100260.3 7 February 2003 (07.02.2003) EP

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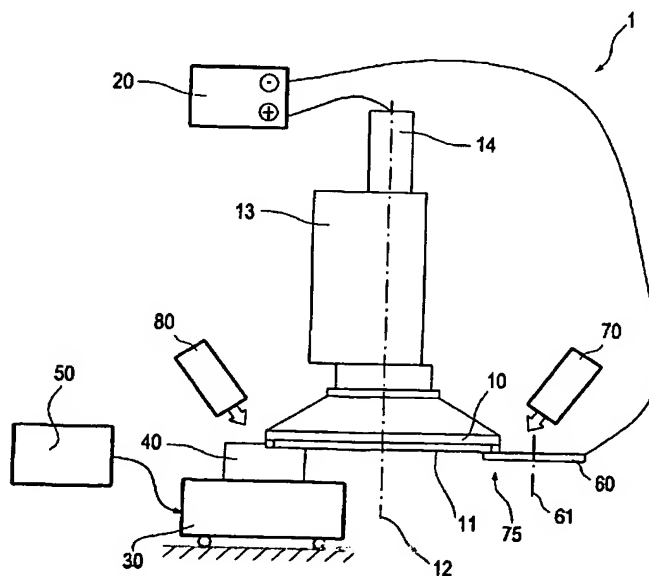
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK,

[Continued on next page]

(54) Title: GRINDING MACHINE



(57) Abstract: A grinding machine (1) for grinding a workpiece (30), comprises the following components: a cup wheel (10) having an annular grinding surface (11); a disc-shaped electrode (60), which is positioned in the vicinity of at least a portion of the grinding surface (11), such that a dressing area (75) is obtained in which a relatively small gap is present between the electrode (60) and the grinding surface (11); feed means (70) for feeding electrolyte to the dressing area (75); and a generator (20) for generating an electric current between the grinding surface (11) and the electrode (60), via the electrolyte. The electrode (60) is movable with respect to the dressing area (75), so that contamination of the electrode (60), which normally occurs as a result of the dressing process, is continuously removed. Consequently, the quality of the dressing process is maintained at a high level.

WO 2004/069478 A3



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Declaration under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT,*

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

25 November 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/050041

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B24B53/00 B23Q15/007

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B24B B23Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 06, 30 April 1998 (1998-04-30) & JP 10 044036 A (RIKEN SEIKO KK), 17 February 1998 (1998-02-17) abstract; figures	1-7, 20-34
X	PATENT ABSTRACTS OF JAPAN vol. 0154, no. 47 (M-1179), 14 November 1991 (1991-11-14) & JP 3 190667 A (OLYMPUS OPTICAL CO LTD), 20 August 1991 (1991-08-20) abstract; figures ----- -/--	1-15, 20-34

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

9 June 2004

Date of mailing of the international search report

12. 10. 2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/050041

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 0182, no. 29 (M-1598), 26 April 1994 (1994-04-26) & JP 6 023667 A (KOYO MACH IND CO LTD), 1 February 1994 (1994-02-01) abstract; figures -----	1,7
X	EP 0 938 948 A (RIKAGAKU KENKYUSHO) 1 September 1999 (1999-09-01) abstract; figures -----	1,7
A	EP 0 920 958 A (RIKAGAKU KENKYUSHO) 9 June 1999 (1999-06-09) abstract; figures -----	1,7,20, 27
A	PATENT ABSTRACTS OF JAPAN vol. 0050, no. 53 (M-063), 14 April 1981 (1981-04-14) & JP 56 009164 A (KOKU KIKAKU KOGYO KK), 30 January 1981 (1981-01-30) abstract -----	1,7,20, 27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2004/050041

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-15, 20-34

REMARK ON PROTEST

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15,20-34

Method and apparatus for dressing having an electrode performing wobbling movements.

2. claims: 7+14,16-19

Method and apparatus for dressing having an electrode with holes.

3. claims: 35-43

Method, apparatus and control circuit controlling the z-position of a slide for supporting and positioing a workpiece.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/050041

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 10044036	A	17-02-1998	NONE	
JP 3190667	A	20-08-1991	NONE	
JP 6023667	A	01-02-1994	NONE	
EP 0938948	A	01-09-1999	JP 11239969 A DE 69901636 D1 DE 69901636 T2 EP 0938948 A1 SG 70675 A1 TW 431936 B US 6149504 A	07-09-1999 11-07-2002 02-10-2002 01-09-1999 22-02-2000 01-05-2001 21-11-2000
EP 0920958	A	09-06-1999	JP 3214694 B2 JP 11156713 A DE 69822088 D1 DE 69822088 T2 EP 0920958 A2 TW 419411 B US 6110019 A	02-10-2001 15-06-1999 08-04-2004 22-07-2004 09-06-1999 21-01-2001 29-08-2000
JP 56009164	A	30-01-1981	NONE	